

## *Phyllonorycter irmella*: a junior synonym of the common *P. lautella* (Gracillariidae)

ERIK J. VAN NIEUKERKEN<sup>1\*</sup>, SJAAK (J. C.) KOSTER<sup>1</sup> & OLE KARSHOLT<sup>2</sup>

<sup>1</sup> Nationaal Natuurhistorisch Museum Naturalis, P.O. Box 9517, NL-2300 RA Leiden, Netherlands

<sup>2</sup> Zoologisk Museum, Universitetsparken 15, DK-2100 København Ø, Denmark

\* corresponding author; e-mail: nieukerken@nmm.nl

**Summary.** *Phyllonorycter irmella* (Palm, 1947) is synonymised with *Ph. lautella* (Zeller, 1846) after study of the holotype from Sweden and the single other specimen, from the Netherlands. Both specimens are worn and therefore show a reduced colour pattern. Since the typelocality of *Ph. irmella* is out of the range of its host *Quercus*, we assume that the specimen either was introduced with plants, a casual vagrant, or that the record is due to mislabelling.

**Zusammenfassung.** *Phyllonorycter irmella* (Palm, 1947) wird mit *Ph. lautella* (Zeller, 1846) synonymisiert, nachdem der Holotypus (aus Schweden) und das einzig andere Stück (aus den Niederlanden) untersucht wurden. Beide Tiere sind abgeflogen und zeigen daher ein reduziertes Fleckenmuster. Da die Typenlokalität von *Ph. irmella* vom nächstliegenden Vorkommen der Futterpflanze *Quercus* weit entfernt ist, nehmen wir an, dass es sich beim Holotypus um ein eingeschlepptes oder eingewandertes Tier handelt, oder dass es falsch etikettiert ist.

**Résumé.** Après l'étude de l'holotype, provenant de la Suède, et le seul autre exemplaire, provenant des Pays-Bas, la synonymie de *Phyllonorycter irmella* (Palm, 1947) avec *Ph. lautella* (Zeller, 1846) est établi. Les deux exemplaires étaient en mauvais état, et en conséquence montrent un dessin réduit. Parce que le localité typique étant éloigné de l'aréal du plant-hôte *Quercus*, nous considérons qu'il s'agit d'un exemplaire introduit, ou occasionnellement migratrice; un explication alternative étant un erreur d'étiquetage.

**Key words.** *Phyllonorycter*, Synonymy, *Quercus*, colour pattern.

### Introduction

The Microlepidoptera fauna of Northwest Europe is the best known in the world: discovery of undescribed species has become a very rare event in the last decades. Many of the specific names which have been newly described in the last 50 years or so, have since been synonymized. A few examples are: *Eratophyes aleatrix* Diakonoff, 1975 (Oecophoridae), described from a single specimen, but found in numerous examples before it was later synonymized with the Turkish *E. amasiella* (Herrich-Schäffer, 1854) (Diakonoff & van Nieukerken 1987) and *Crambus hertwigae* Rasmussen, 1964 (Pyralidae: Crambinae), described from one male from Denmark, which turned out to be a synonym of *Agriphila tristella* (Denis & Schiffermüller, 1775) (Bleszynski 1965). Species based on unique specimens are often synonymized, only in some cases these species have been shown to be good species and were found again, especially in very difficult groups. Species described on the basis of unique specimens which have never been found again should be regarded with due suspicion and preferably such types should be re-examined.

*Phyllonorycter irmella* (Palm, 1947) is a species named on the basis of one specimen, which for a long time was the only one known, until recently an old specimen from the Netherlands was also identified as *irmella* (Kuchlein & Langohr 1998). The

third of us already expressed his doubts about a separate identity for this species (Karsholt in Buszko 1996: 303, note 1260). We will show that his doubts were justified.

The genus *Phyllonorycter* is a large genus of small micro-moths with leaf mining larvae, occurring almost world-wide but especially in the Holarctic region. In Europe about 125 species are listed (Buszko 1996), but a revision of this genus has never been undertaken. The most complete treatments are those of the British fauna (Emmet *et al.* 1985) and the key to the species of the European part of the USSR (Kuznetsov 1990). Further there are keys to the French and British species (Bradley *et al.* 1969) and the Czech and Slovak species (Gregor 1952). Deschka described in several papers many new species, especially from southern Europe and nearby regions (e. g. Deschka 1974, 1976). Although many of the species are common and well known, a critical revision of type material is badly needed, in particular for southern European species.

***Phyllonorycter lautella* (Zeller, 1846)**

*Lithocolletis lautella* Zeller, 1846: 194. Syntypes: Austria, Wien, Mann & Germany, Frankfurt am Main, v–vii, from Quercus, von Heyden (not found in BMNH, possibly lost) [not examined].

*Lithocolletis irradiella* Scott, 1854: 9, pl. I, fig. 1. Holotype, Great Britain, Renfrew, vii., J. Scott (probably lost) [not examined].

*Lithocolletis irradiella* Stainton, 1854: 269. Holotype, Great Britain, Renfrew, vii., J. Scott (probably lost) [not examined].

*Lithocolletis irmella* N. Palm, 1947: 41. Holotype male: Sweden, Medelpad, Sundsvall, North Town Hill, 26.vii.1946, N. Palm (Lund), genitalia slide (Museum of Zoology, Lund University). [examined].

**Syn.n.**

*Lithocolletis irmella* Kumata, 1963: 66 (comparison with *L. maculata* Kumata); Kuznetsov, 1981: 236, 240 (fig. 224); 1990: 310, 317.

*Phyllonorycter irmella* Buszko, 1996: 52; Kuchlein & Langohr, 1998: 50 (record Netherlands).

Material examined. – Netherlands: ♂ (published as *Ph. irmella*), Bloemendaal, 22.v.1910, W. H. J. van Beek (Zoological Museum Amsterdam). – Sweden: Holotype of *irmella*.

Long series from Denmark, Great Britain, Netherlands and Poland (Museum collections in Amsterdam, Copenhagen, Leiden and London, coll. Koster).

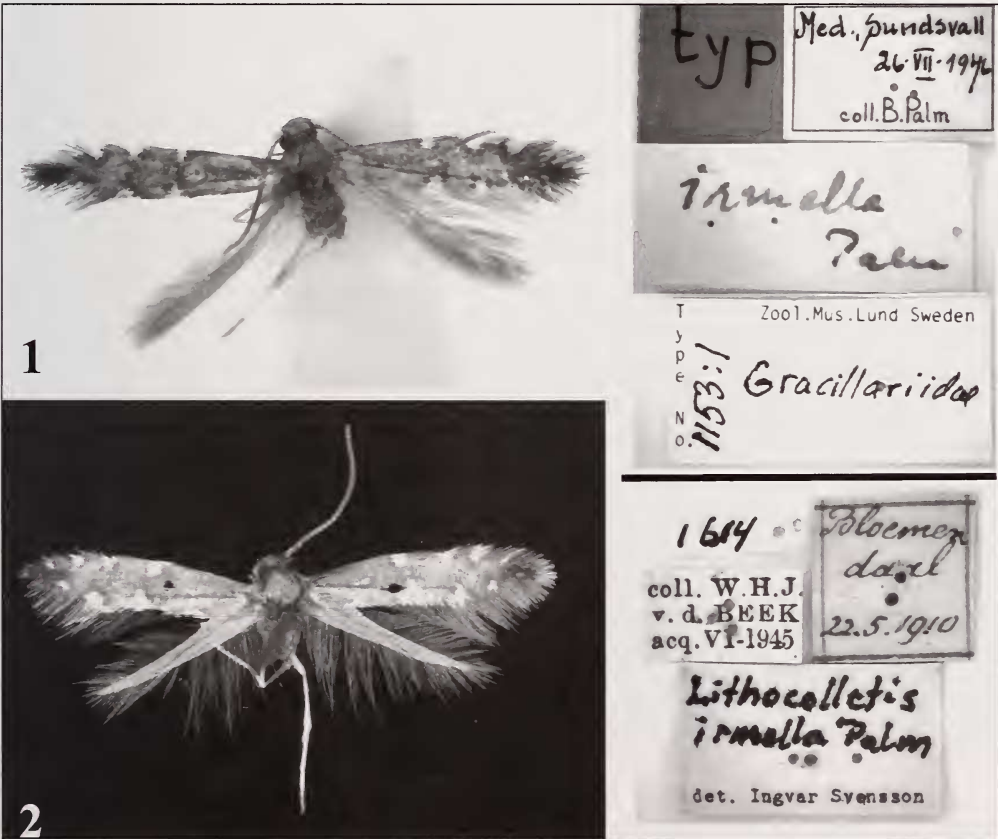
*Lithocolletis irmella* was described from Sundsvall, Province of Medelpad in Sweden (and not Nyhamn as stated by Kuchlein & Langohr 1998). Palm made clear himself that he was not certain of its status as a separate species, since he had a single specimen only (loc. cit. page 36: ‘yet it is with the greatest hesitation that I proceed to do this, as the material is very small, only one specimen of each species’). His suggestion that the species was probably associated with *Betula*, *Alnus*, *Sorbus* or *Salix* probably has misled subsequent authors, since the specimen is clearly different from all known species feeding on these hosts. After Palm’s description *Ph. irmella* appeared in some keys (i.e. Kuznetsov 1990), but as far as we know not in other publications.

We considered it most likely that *Ph. irmella* was an unusual form of one of the commoner species and compared first the published illustrations with those of other species. We even compared them with Japanese species (Kumata 1963), especially since Kumata mentioned that his *Ph. maculata* (Kumata, 1963) on *Alnus hirsuta* Turcz. ex Rupr. resembles *Ph. irmella*. On the basis of the genitalia illustrations, we considered *Ph. lautella* (Zeller) as the most likely candidate, a conclusion also reached by G. Deschka (*in litt.* to O. Karsholt 1997).

**Comparative notes**

Wing pattern. – The holotype of *Ph. irmella* (Figs. 1, 3) is rather worn. The colour pattern is a reduced pattern of *Ph. lautella*, and seems to lack the characteristic basal streak and dorsal mark. There are four costals and three dorsals, poorly edged; the first streaks do not form a fascia. When looking carefully under larger magnification, there still appear to be some silver scales present in the place of the basal streak in the right wing. The absence of these marks and the poor edging are largely caused by wearing, and not a characteristic pattern.

The Dutch specimen is very similar to the holotype, and thus was ‘correctly’ identified as *Ph. irmella*. The basal streak and dorsal mark seem to be missing as well (Figs. 2, 4), and were left out in the figure by Kuchlein & Langohr (1998). However, here remaining silver scales are even easier to see. There are also four costals and three dorsals and a fascia is missing.



**Figs. 1–2.** *Phyllonorycter lautella*: 1 – Holotype ♂ of *Lithocolletis irmella* Palm, with labels; 2 – Dutch specimen identified as *P. irmella*, with labels. All photographs by EJvN, with Zeiss AxioCam digital camera on Stereomicroscope Stemi SV11 (moths) or Zeiss Axioskop (genitalia).

We compared these specimens with a range of *Ph. lautella* from the Netherlands and Denmark, and noticed a considerable variation in colour pattern. Most specimens have three costal and dorsal strigulae (Fig. 8), but quite a few have an additional fourth costal and the first dorsal and costal often form a fascia (Fig. 7). The basal streak and dorsal mark are sometimes reduced, but in most cases this seems to be the effect of abrasion, though some less worn specimens show some reduction (Figs. 5–6). Actually, specimens without a fascia cannot be identified using the keys by Bradley *et al.* (1969), those with four costals are not mentioned by Emmet *et al.* (1985), but are keyed out correctly.

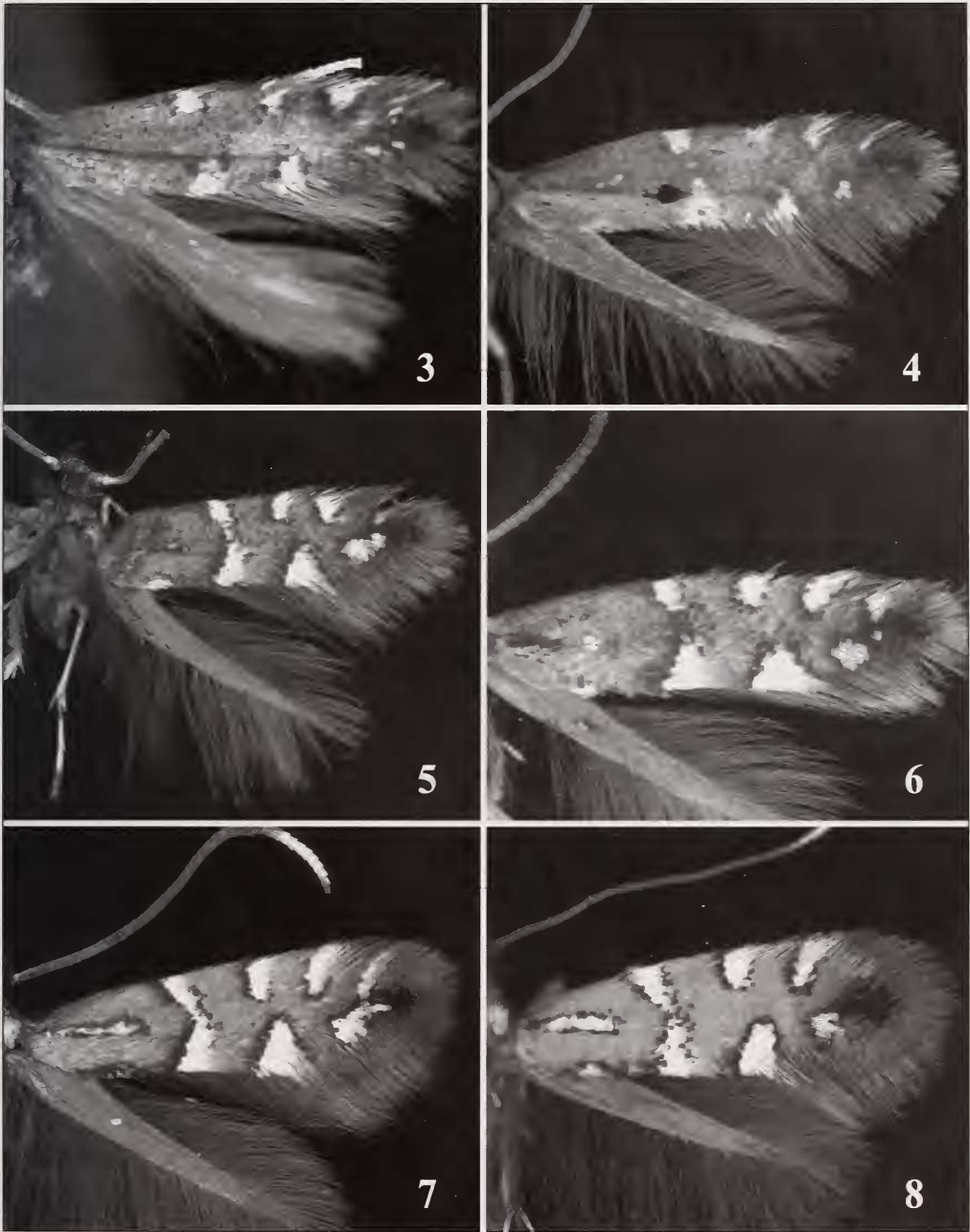
In conclusion: externally both specimens fall within the variation of *Ph. lautella* especially when the worn condition is taken into account.

The variability of this species is further shown by a ‘variety’, described in the 19th century as the species *Lithocolletis irradiella*. This was described from one specimen, having olivaceous-fuscous forewings, with a slender, short, silvery basal streak, and three costal and three dorsal streaks. Descriptions of *L. irradiella* were published independently by Stainton and Scott in 1854, based on the same specimen that Scott presented to Stainton. The description by Scott was apparently published before that of Stainton: the title page of Stainton (1854: v) was dated 1st July 1854, whereas Scott’s paper was ‘read’ 3rd October, 1853. The holotype of *irradiella* is not present in the Natural History Museum in London (BMNH) and most likely lost, but there are several other British *Ph. lautella* specimens labelled as *irradiella* in the Stainton collection. They fall easily within the above-described variability and resemble the ‘*irmella*’ specimens. Already Snellen (1882) considered *L. irradiella* most likely to be *lautella*, and since then it has always been regarded as a synonym or variety of *lautella*.

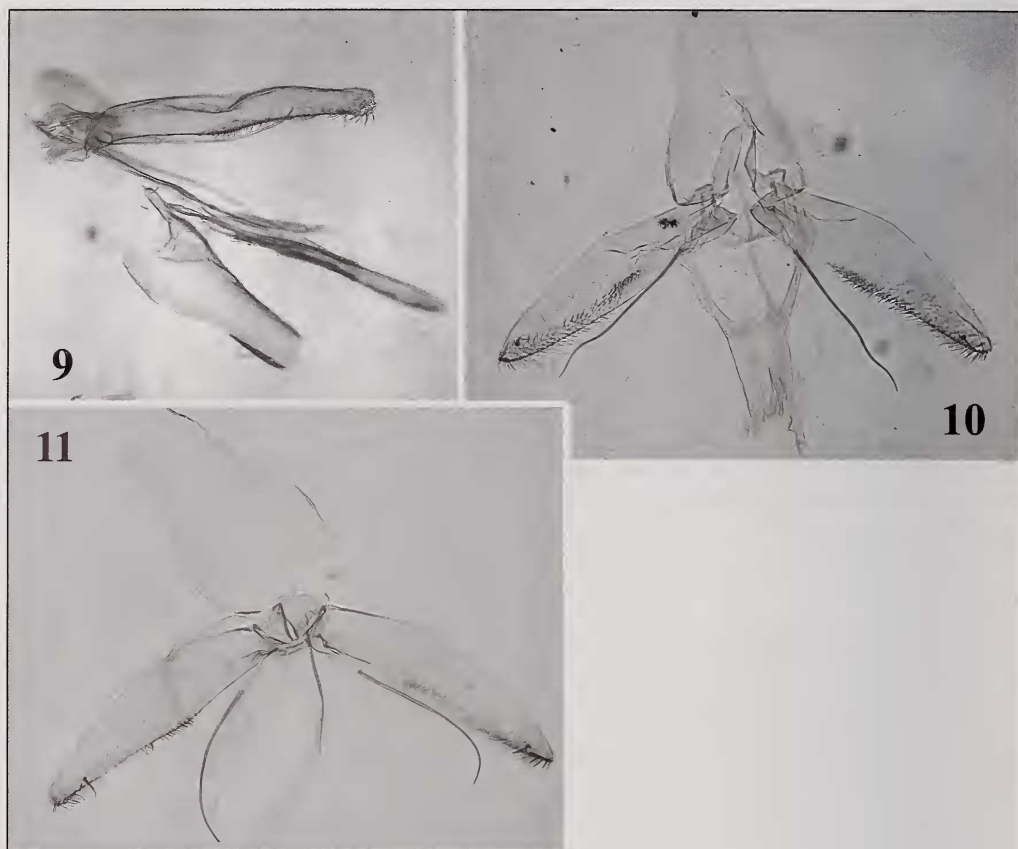
**Male genitalia.** – In the figures in Palm (1947) and Kuchlein & Langohr (1998) there are some differences with published figures of *Ph. lautella*. We studied the genitalia under high magnification (Figs. 9, 10, 12–15) and prepared several *lautella* males for comparison (Figs. 11, 16–18). Both the holotype and the Dutch specimen show the characteristic spine on the valvae, also seen on Palm’s figure, but not in Kuchlein & Langohr (1998). These authors especially mention that this spine is lacking, we suppose because they did not use sufficient magnification. When comparing the illustrations here it is very clear that the genitalia are identical to those of *Ph. lautella*. Few species have similar genitalia, probably only *Ph. pseudolautella* (Kumata, 1963) and *Ph. pygmaea* (Kumata, 1963) from Japan, and no European species could be confused with *lautella*. We therefore conclude that *Ph. irmella* is a synonym of *Ph. lautella*.

## Discussion

One problem has not yet been solved: the holotype of *Phyllonorycter irmella* was collected along the Botnian Gulf, about 300 km north of the nearest occurrence of oaks (*Quercus robur* L.), the only known host plant for *Ph. lautella*. There is no mention of oaks in Palm’s paper, but according to Nils Ryrholm (*pers. comm.*), planted oaks occur in most towns along the Botnian Gulf. Still, oak-feeding *Phyllonorycter*-species are not listed from this province (‘*landskap*’) in the most recent version of the Swedish checklist (Gustafsson 2001).



**Figs. 3-8.** *Phyllonorycter lautella*, variability of wing pattern: **3** - Holotype ♂ of *Lithocolletis irmella* Palm: four costals, no fascia, basal and dorsal streak worn; **4** - Netherlands, Bloemendaal: four costals, no fascia, basal and dorsal streak worn, but visible; **5** - Netherlands, Breda, four costals, fascia present, basal and dorsal streak very small, but visible; **6** - Same specimen, inverted left wing, four costals, no fascia, basal and dorsal streak small; **7** - Netherlands, Schipborg, complete pattern with four costals and fascia; **8** - Netherlands, Vijlenerbosch, ditto, but with three costals.

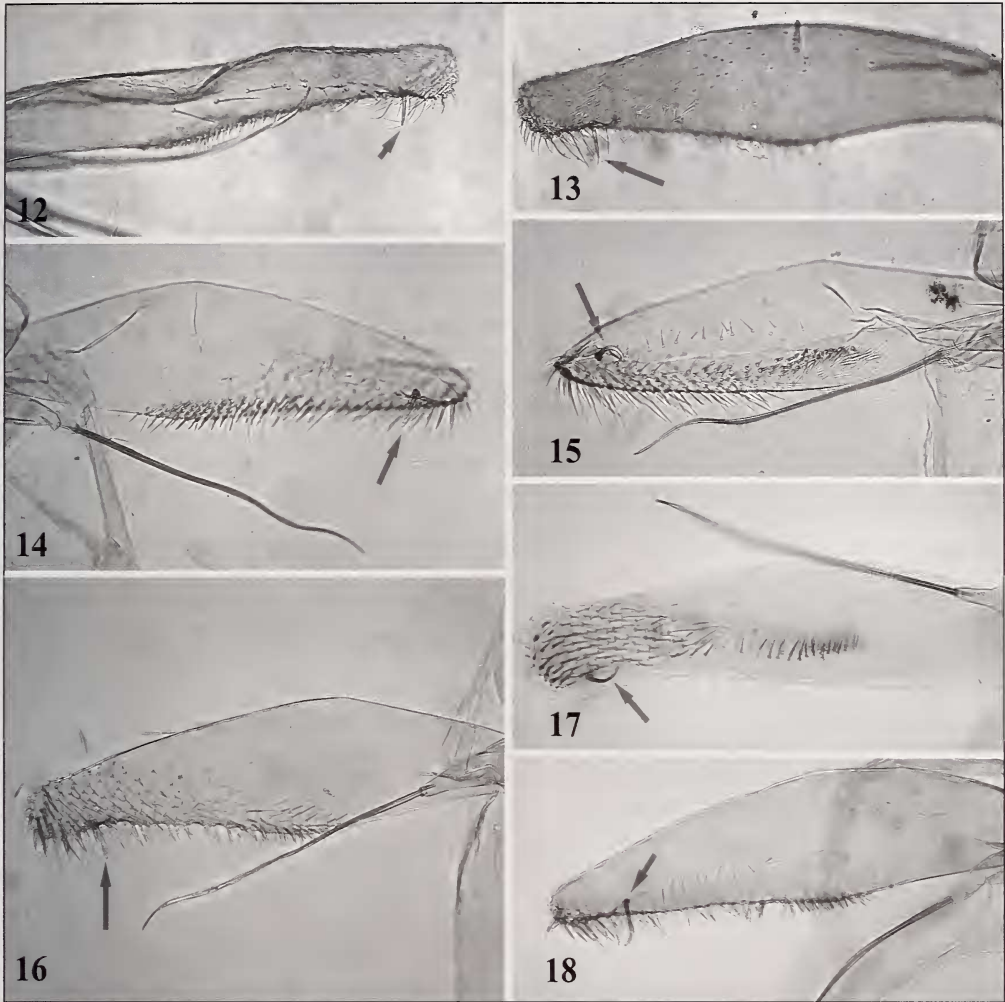


**Figs. 9–11.** *Phyllonorycter lautella*, male genitalia: **9** – Holotype ♂ of *Lithocolletis irmella* Palm, lateral view; **10** – Netherlands, Bloemendaal, slide GRL1614; **11** – Netherlands, Denekamp, slide JCK2593.

We consider that there are three possible explanations.

1. The specimen was introduced with oak saplings from tree nurseries further south.
2. Many insects migrate or disperse along coasts, and the specimen was taken on a ship near the coast or on the coast during high summer. Dispersal often takes place on warm days and is most likely to occur in central Sweden with a southern or south-eastern wind. It is very well possible that a specimen can be carried about 300 kilometres on the wind, either from the Stockholm area where oaks are common or from south-western Finland or Åland. Spreading of tiny gracillariid moths occurs frequently, as now can be seen in the fast colonisation of Europe by such species as *Cameraria ohridella* Deschka & Dimic, 1986 and *Phyllonorycter robiniella* (Clemens, 1859). It is assumed that wind plays an important role in this expansion.
3. A further explanation might be mislabelling of the specimen. In large collections this happens now and then, and there are some suggestions that Palm in his later days was rather careless with his material (I. Svensson *in litt.* to O. Karsholt).

Whichever of the explanations is true, the synonymy presented here is beyond doubt. The fact that it was not recognized earlier is of some concern to us, and prompts us to



Figs. 12-18. *Phyllonorycter lautella*, male genitalia, valva, showing variability in different views. Strong spine indicated by arrows: 12, 13 - Holotype *L. irmella*; 14, 15 - Netherlands, Bloemendaal, slide GRL1614; 16 - Netherlands, Zwannenwater, slide JCK2592; 17 - Netherlands, Breda, slide JCK4874; 18 - Netherlands, Denekamp, slide JCK2593.

plead for more careful re-examination of types when studying large and difficult groups of insects, especially when one wants to describe new species.

We also would like to make a plea against describing new species on the basis of single specimens, especially in well-studied regions. Although characters such as colour pattern are fairly constant and diagnostic in *Phyllonorycter*, aberrant specimens do occur, and these aberrations are probably caused by rather simple mutations. We have seen examples of *Phyllonorycter* species missing one or two of their fasciae or spots, which could easily be held for a different species when not compared with other material. In general when describing a new species, the considerations on which basis this decision was taken should be outlined in the paper. Yet few taxonomists do so. A good

example is Kaila (1997) who explained at length why it was warranted in that case to describe some species on the basis of single specimens.

### Acknowledgements

We would like to thank Roy Danielsson (Lund, Sweden) and Willem Hogenes (Amsterdam, Netherlands) for the loan of respectively the holotype and Dutch specimen of *Ph. irmella*. We are grateful to Jaroslaw Buszko (Toruń, Poland), Zdenek Lastuvka (Brno, Czech Republic), Carlos Lopez Naamonde (Ascot, UK), Nils Ryrholm (Uppsala, Sweden), Ingvar Svensson (Österslöv, Sweden), Paolo Triberti (Verona, Italy) and Kevin Tuck (London, UK) for providing valuable information and discussion. Kevin Tuck also kindly provided comments on the manuscript.

### References

- Bleszynski, S. 1965. Crambidae. – In: H. G. Amsel, F. Gregor & H. Reisser (eds.), *Microlepidoptera Palaearctica*, **1** (1): i–xlvii, 1–553; **1** (2): pls 1–133. Wien.
- Bradley, J. D., S. N. A. Jacobs & W. G. Tremewan 1969. A key to the British and French species of *Phyllonorycter* Hübner (*Lithocolletis* Hübner) (Lep., Gracillariidae). – *Entomologist's Gaz.* **20**: 3–33.
- Buszko, J. 1996. Gracillariidae. – In: O. Karsholt & J. Razowski (eds.), *The Lepidoptera of Europe. A distributional checklist*. – Apollo Books, Stenstrup: 48–54.
- Deschka, G. 1974. Neue Lithocolletiden von Zypern (Lepidoptera, Lithocolletidae). – *Ent. Ber., Amst.* **34**: 174–179.
- Deschka, G. 1976. Lithocolletidae von Madeira (Lepidoptera). – *Ent. Ber., Amst.* **36**: 90–96.
- Diakonoff, A. 1975. A surprising new addition to the Dutch fauna of Microlepidoptera (Oecophoridae). – *Ent. Ber., Amst.* **35**: 187–189.
- Diakonoff, A. & E. J. van Nieukerken 1987. *Eratophyes amasiella* (Herrich-Schäffer) comb. nov., a senior synonym of *E. aleatrix* Diakonoff (Lepidoptera: Oecophoridae). – *Ent. Ber., Amst.* **47**: 103–104.
- Emmet, A. M., I. A. Watkinson & M. R. Wilson 1985. Gracillariidae. – In: J. Heath & A. M. Emmet (eds.), *The moths and butterflies of Great Britain and Ireland 2, Cossidae–Heliodinidae*. – Harley Books, Colchester: 244–363, pls. 2, 10–13.
- Gregor, F. 1952. Moli rodu *Lithocolletis* Hb. na dubech v CSR. – *Ent. Listy* **1** (15): 1–56, pls. i–viii.
- Gustafsson, B. 2001. *Catalogus Lepidopterorum Sueciae*. – <http://www.nrm.se/en/catalogus.html.se>
- Kaila, L. 1997. A revision of the Nearctic species of *Elachista* s.l. II. The *argentella* group (Lepidoptera, Elachistidae). – *Acta zool. fenn.* **206**: 1–93.
- Kuchlein, J. C. & G. R. Langohr 1998. *Phyllonorycter irmella* (Lepidoptera: Gracillariidae), a remarkable addition to the Dutch list. – *Ent. Ber., Amst.* **58**: 49–51.
- Kumata, T. 1963. Taxonomic studies on the Lithocolletinae of Japan (Lepidoptera: Gracillariidae), 1–3. – *Insecta matsum.* **25**: 53–90, 26: 1–48, 69–88.
- Kuznetsov, V. I. 1990. Family Gracillariidae (Lithocolletidae). – In: M. I. Fal'kovich & G. S. Medvedev (eds.), *Keys to the insects of the European part of the USSR*, **4**, Lepidoptera, part 2. – E. J. Brill, Leiden etc.: 199–410. [English translation of Russian original, published in 1981].
- Palm, N.-B. 1947. Microlepidoptera, Neuroptera, and Trichoptera from Medelpad and Norbotten, Sweden. With descriptions of some new Tineid species. – *Opusc. ent.* **12**: 35–49.
- Rasmussen, B. W. 1964. Eine neue Art aus der *Crambus tristella* Schiff.-Gruppe (Lep., Pyralidae). – *Ent. Meddr.* **32**: 391–392.
- Scott, J. 1854. Description of a new species of *Lithocolletis*. – *Trans. ent. Soc. London* (2) **3**: 9–10, pl. I.
- Snellen, P. C. T. 1882. *De vlinders van Nederland. Microlepidoptera, systematisch beschreven*, 2 vols. – E. J. Brill, Leiden, 1196 pp.
- Stainton, H. T. 1854. *Insecta Britannica. Lepidoptera. Tineina*. – Lovell Reeve, London. viii + 313 pp., 10 pls.
- Zeller, P. C. 1846. Die Arten der Blattminirergattung *Lithocolletis*. – *Linn. ent.* **1**: 166–261, pl. 1.